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(54) **Milky mousse; preparation process; dessert**

(57) A milky mousse has a high level of alive and viable lactic ferments remaining constant for all its shelf life, the presence of the lactic ferments providing said mousse with exclusive and personalized organoleptic and structural characteristics. When mixed with a lower layer usually employed for producing desserts, said mousse enables to have an end-product free of additives and with a good nutritional value. A process for preparing said milky mousse comprises concentrating and pasteurizing whole milk, cooling, adding lactic ferments, maturing at 24–30°C to pH 4.9–5.0, curd-breaking at this pH, ultrafiltering at 40°C and mixing the concentrate with cream and saccharose. The product is cooled, aerated and packaged, for example as an upper layer of a dessert.

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MILKY MOUSSE, ITS PREPARATION AND USE

The present invention relates to a new milky mousse containing an high level of alive and viable lactic ferments providing it with a particularly balanced, low acidulous, agreeable and dainty taste, to a process for its preparation and to its use in the manufacturing of desserts.

Generally, with "dessert" the end-course of a dinner is meant, consisting prevailingly of fruit, cheese and sweet. In the present context, the term dessert will mean exclusively a particular sweetmeat in cup or glass comprising a lower layer with ingredient of different nature, and a milky mousse upper layer, wherein said layers are mixed together just before ingestion by consumer.

Many types of desserts belonging to this class are known in the art, the best known of which consisting however of a lower layer comprising generally chocolate, vanilla, coffee or fruit compound, and of an upper layer with exclusively milky mousse. As a rule, the lower:upper layer ratio is of 5-7:1.

As used herein, the expression "mousse" refers to a soft compound obtained from milk, which, when mixed with the lower layer, provides a tasty dessert having a particular and refined taste. Milky mousses to utilize in association with the mentioned lower layers to give a dessert, are known. In all the presently available products no lactic bacteria have been however detected. This can be imputable to the most different factors, likely to heat treatments which are responsible for the destruction of any viable form, both lactic and not.

As mentioned above, all the available mousses do not contain alive lactic ferments, and they have been added with thickening/emulsifying agents and aerated

with inert gas in order to have a soft and delicate cream, the softness of which is exclusively imputable to having englobed large amounts of gas. Bacteriological tests carried out on commercially available products showed the absolute absence of any alive and viable lactic ferment.

It was therefore an object of the present invention to provide a new milky mousse usable as upper layer in usual desserts, which exhibits a soft and yielding appearance without the need of being aerated with high gas levels, contains a large number of alive and viable lactic ferments of different type, is additive-free and can be mixed with good final results, besides the well-known chocolate, vanilla, coffee or fruits compositions based layer combinations, also with new chocolate, egg-flip, coffee cream, wood strawberries, wood fruit and other food additives-free based compositions, thus obtaining a composite with new taste and appearance.

The present invention has been also developed for the purpose of providing an improved method for the preparation of the mosuse described above.

In accordance with the present invention, the above requirements have been met by means of a new milky mousse having a particularly balanced, low acidulous, agreeable and dainty taste, said mousse being characterized in that it contains a high alive and viable lactic ferments level which remains constant for all its shelf life and the presence of which provides the product whit exclusive and personalized organoleptic and structural characteristics. Additional aspects, objects, advantages and features of the invention will be apparent to those skilled in the art from the following detailed description thereof and from the appended claims.

Object of the invention is therefore a new milky mousse having a well-balanced, low acidulous and particularly agreeable and dinty taste, said mousse being additive-free, containing a high alive and viable lactic ferments level, and which, when combined with the lower layer usually employed for manufacturing desserts, provides the whole with an exquisitely personalized taste.

The lactic ferments employed in the practice of the present invention are known. They are particularly the thermophilic ferments selected from various strains of *St. thermophilus* and the mesophilic ferments (*St. cremoris*, *lactis*, *diacetylactis*, *L. cremoris*). The above ferments may be employed alone or in every mixture thereof, and this to obviate the variableness of organoleptic and structural characteristics arising from the employed raw materials flucutations, that can not be comprensated by adding suitable additives (aromatic agents, thickening agents, etc.). And this in that in the present case only natural raw materials are used. Anyway, whatever the use takes place, the amount of termophilic ferments is generally of from .1 to 2%, and that of mesophilic of from 0,1 to 0,5%. By the way it is noticeable that in the mixture of the fermented milk with cream and saccharose, it appeared sometime suitable to add also probiotic bacteria, particularly *Bifidobacterium infantis*.

As mentioned above, also the substrate with which the mousse will be mixed can undergo completely new and never described changes. Besides chocolate, lower layers comprising egg-flip, coffee cream, wood strawberry, wood fruit and like could also be used. Manufacturing of fruit based ingredients takes place starting from conveniently selected fresh fruit. The mild physical and thermic treatments to which the

fruit is subjected during its preparation, allow to best exploit the valuable organoleptic characteristics, while at the same time protecting the original structural characteristics.

As stated above, the soft appearance of the mousse is reached as a rule, with the aid of an aeration with inert gas (nitrogen). In the case of the mousse of the present invention, before being aerated with inert gas the concentrated fermented milk is added with cream and saccharose. After homogenization and finishing, the fermented milky product aeration is reached without using the thickening/emulsifying agents normally employed in order to retent higher amounts of gas. The softness of the mousse of the present invention is therefore the result of particular completely natural treatments only.

Another object of the present invention is the use of the above mentioned mousse for preparing desserts, wherein said mousse is dosed on a lower layer, and the mixing of both the layers before the use will provide a product having a delightful and delicate taste.

The following compositions for the lower layer of the new available desserts are here intended in an illustrative and not a limitative sense.

CHOCOLATE CREAM

% values

a) cream (whole milk)	60-65
b) chocolate powder	20-25
c) saccharose	10-12
d) wheat meal (00 type)	2-5

EGG-FLIP

a) yolk + saccharose	50-53
b) marsala liqueur	29-33

c) saccharose	12-15
d) wheat meal (00 type)	3-5

COFFEE CREAM

a) cream/whole milk	50-53
b) saccharose	38-40
c) wheat meal (00 type)	4-6
d) freeze-dried soluble coffee	2-5
e) cocoa powder	0,5-1,5

WOOD STRAWBERRY

a) whole and puree wood strawberry	70
b) cane sugar	15
c) saccharose	15
d) fructose	8

WOOD FRUIT

a) bilberry (Vaccinium myrtillus)	32
b) ribes	22
c) raspberry	16
d) cane sugar	15
e) saccharose	15
f) fructose	8

All the above listed percentages are by weight. Logically, the above values can undergo some modifications or changes without however departing from the scope of the present invention. In every case, the percentage ratio of fruit to soluble solids is preferably of 70:44. It is at least noteworthy, that in the fruit based compositions the employed sugar mixture is new, both as far as the amount and the typology is concerned.

While fruit is used in the fresh and integral state, the other ingredients are stored in air-tight containers (00 type wheat meal, chocolate powder,

yolk, saccharose, freeze-dried coffee) and in separated tanks (whole milk and/or cream). It follows then their mixing by on line dissolution in milk/cream, a heat treatment with scraped surface heat-exchangers at 95°-110°C, a further treatment for having the desired structure, cooling at 4°C in an heat exchanger and storage in reservoir with sterile air overpressure, which is equipped with a stirring system.

As in the prior art a lower layer for dessert comprising wood strawberry or wood fruit has been never described, on said compositions tests were carried out to establish properties and to define characteristics thereof. The obtained results are reported here below :

Chemical-physical characteristics for wood fruit:

R.O. (20°C)	44 ± 2 Bx
R.S. (70°C under vacuum)	46 ± 2%
pH	3,4 ± 0,2
Flowability (Bostwick 25°C, 60")	6 ± 2
Foreign bodies and/or materials	None
Additives	None
Heatresistant yeasts and molds	None
Pathogenic agents	None
Total bacteric load	less than 1000 g x 1g.

Chemical-physical characteristics for wood strawberry

R.O. (20°C)	44 ± 2 Bx
R.S. (70°C under vacuum)	46 ± 2%
pH	3,2 ± 0,2
Flowability (Bostwick 25°C, 60")	6 ± 2
Foreign bodies and/or materials	None
Additives	None
Heatresistant yeasts and molds	None

Pathogenic agents	None
Total bacteric load	less than 1000 g x 1g.

It is also important to emphasize that the particular ingredients and milky mousse manufacturing technology provides the end-product with a new and original aroma which makes it entirely innovative. The restricted heat treatments to which the ingredients undergo, allow the known natural, typical aromatic characteristics to remain unchanged and integral, thus no subsequent addition of integration natural aroma being necessary.

The above reported centesimal composition discloses a nutrient elements ratio, thus obtaining a dessert combining deliciousness and a good nutritional interest.

The milky mousse and ingredient quantitative proportions have been selected for reaching the following requisites :

1) better exploitation of the nutritional/healthy properties arising from a major presence of the fermented milky mousse in comparison with the lower layer ingredient according to the known products (milky mousse: lower layer ingredient ratio 1:1, 2:3, 3:7 or 60:40 in comparison with the known 5:7,1);

2) balanced synergy between the milky mousse and ingredient organoleptic characteristics, in order to make more savoury the dessert, thus being able not to add aromatizers;

3) less amount of inert gas in the milky mousse in order to provide a milk richer product, at the same time maintaining the mousse softness.

This invention comprises also an improved process for preparing the above milky mousse, said



process comprising the steps of :

- a) receiving and storing whole milk and heating it at 50-55°C for centrifugal polishing,
- b) further heating at 90°-95°C,
- c) concentrating in order to have 5-12% of water evaporated off,
- d) bacterically depurating the milk by pasteurization at 95°C,
- e) cooling and adding selected lactic ferments,
- f) maturing at 24°-30°C,
- g) curd breaking at pH 4,9-5,0 and heating at 40°C,
- h) fermented milk ultrafiltration at 40°C,
- i) mixing of the concentrated fermented milk with cream (35-40% fat) and saccharose,
- l) homogenizing or smoothing the mixture,
- m) cooling at 4°C and subsequent storing with sterile air overpressure,
- n) aerating and packaging.

As far as manufacturing steps a) to d) are concerned, these are steps well known to the persons skilled in the art and therefore there is no need to describe them closer. It is at contrary noteworthy, that the presence in the milky mousse of alive and viable lactic ferments in an amount of 300-500 millions per gram, is essential for obtaining the product of the present invention.

As mentioned above, the lactic fermentation decreases the pH value owing to the production of lactic acid by bacteria constituting the starter. Experimental tests allowed the patentee to determine the break point (working of the obtained curd for the subsequent ultrafiltration) when a pH of 4,9-5,0 is reached. In the known procedures this does not occur, in that the products are always at neutral pH.

While also step f) can be regarded as known, it is important to point out that the curd breaking at a

given pH value (step g)) is completely new, and that ultrafiltration (step h)) was carried out directly on acidified milk in order to increase the proteic level and the entire dry material, thus contributing to obtain a natural thickening of the product. Also temperature must be selected for preserving the number and viability of the lactic ferments, avoiding the preliminary heat treatments usually employed in the known procedures.

Mixing of the concentrated fermented milk with cream and saccharose is necessary (step i)) for minimizing and repressing the acidulous character produced in the lactic fermentation.

In step n) the mixture treatment was carried out in a suitable plant for having the desired soft consistence. It comprises a feed unit with volumetric pump (for a constant flow of the mixture), an inert gas injection unit in which the gas is mixed with the product, and a cylinder the walls of which are cooled with ice water. Air injection takes place in the range of about 30% in order to obtain a mousse having a density of 0,7 to 0,8 kg/l. Said aeration occurs without the use of thickening/emulsifying agents and the softness of the new milky mousse is thus the result of natural physical treatments only.

Also the dosage and packaging unit is of a new design, thus avoiding any possible destructurization phenomenon or contamination of the product.

The following example is presented to illustrate this invention. All parts, percentages and proportions of ingredients referred herein and in the appended claims are by weight unless otherwise indicated.

#### Example

Raw milk (3,5% fat) stored at a temperature of 4°C was cleaned and titrated for bringing it to a fat

content of about 7%. The milk was then preheated at a temperature of 50-55°C for centrifugal cleaning, degased, further heated at 90-95°C and concentrated for having 5-12% of water evaporated off. Follows then a bacteric depuration by pasteurization at 95°C with on-line rest for 5 minutes, cooling at the maturation temperature of 24-30°C and the addition of the selected thermophilic and/or mesophilic lactic ferments in an amount of 1-2% and 0,1-0,5% respectively.

The mentioned ferments may be employed as a single component or as any mixture thereof, and this to obviate the organoleptic and structural characteristics variability arising from the raw materials fluctuations, which can not be compensated by adding suitable additives (tickening, aromatising agents) in that in the present invention only natural raw materials are used.

The subsequent maturation was carried out in reservoirs with sterile air overpressure for 8-10 hours, after which the product is allowed to stand, and when a pH of 4,9-5,0 is reached, the curd is broken and the temperature was increased to 40°C. The fermented milk ultrafiltration was effected at a mean temperature of 40°C, thus obtaining a total solid content of 23-24%, the concentrated fermented milk was then mixed with cream (35-40% fat) and saccharose, eventually adding probiotic bacteria (*Bifidobacterium infantis*).

The subsequent homogenization and/or smoothing of the mixture (concentrate + cream + saccharose) thus obtained occurs for providing the product with a particular microstructure; the whole was then cooled on a heat exchanger until 4°C and transferred in a tank with sterile air overpressure.

The product was then aerated with nitrogen

englobing 20-30% of inert gas, and the mean density after such a treatment resulted to be 0,8-0,7 kg/l. At this point the product was transferred to the dessert manufacturing plant equipped with dosage station for the upper and lower layers, thus obtaining an end-product in which the mousse to lower layer ratio is preferably of 1:1, 2:3, 3:7 or 60:40, that is well different from the known 1:5-7. The finished packaging was closed with an aluminium cap, placed in a refrigerator at 4°C and maintained at such a temperature for about 18-24 hours, after which the product is ready for shipment.

CLAIMS

1. Milky mousse of balanced, low acidulous and particularly agreeable and delicate taste, characterized in that it is free from additives and exhibits an high alive and viable lactic ferments load which remains constant for all its shelf life, and the presence of which provides the product with exclusive organoleptic and structural characteristics.

2. Milky mousse according to claim 1, characterized in that it contains mesophilic lactic ferments.

3. Milky mousse according to claim 1, characterized in that it contains thermophilic lactic ferments.

4. Milky mousse according to claim 1, characterized in that it comprises mesophilic and thermophilic lactic ferments.

5. Milky mousse according to claim 1, characterized in that it comprises also probiotic bacteria.

6. Milky mousse according to claim 2, characterized in that the mesophilic ferments are selected from *St. cremoris*, *St. lactis*, *St. diacetylactis* and *L. cremoris*, while termophilic ferments are selected from different *St. thermophilus* strains.

7. Milky mousse according to claim 5, characterized in that the probiotic bacterium is *Bifidobacterium infantis*.

8. Milky mousse according to claims 1-7, characterized in that the thermophilic ferments are present in a amount of 1 to 20%, while the mesophilic ferments in an amount of 0,1 to 0,5%.

9. A process for preparing a milky mousse according to claims 1-8, useful for manufacturing

desserts, which comprises the steps of:

- a) receiving and storing whole milk and heating it at 50-55°C for centrifugal polishing,
- b) further heating at 90°-95°C,
- c) concentrating in order to have 5-12% of water evaporated off,
- d) bacterically depurating the milk by pasteurization at 95°C,
- e) cooling and adding selected lactic ferments,
- f) maturing at 24°-30°C,
- g) curd breaking at pH 4,9-5,0 and heating at 40°C,
- h) fermented milk ultrafiltration at 40°C,
- i) mixing of the concentrated fermented milk with cream (35-40% fat) and saccharose,
- l) homogenizing or smoothing the mixture,
- m) cooling at 4°C and subsequent storing with sterile air overpressure,
- n) aerating and packaging.

10. Process according to claim 9, characterized in that in step h) the ultrafiltration was carried out directly on acidified milk in order to increase the proteic value and the dry total material.

11. Process according to claims 9 and 10, characterized in that the curd breaking was effected at a pH of 4,9-5,0.

12. Process according to claims 9-11, characterized in that aeration of step n) was carried out with 20-30% nitrogen and the product resulting density ranges from 0,8 to 0,7 kg/l.

13. Process according to claims 9-12, characterized in that in step e) the lactic ferments are thermophilic and/or mesophilic ferments in an amount up to 1-2% and 0,1-0,5% respectively.

14. Process according to claims 9-13, characterized in that the thermophilic ferments are selected from different *St. thermophilus* strains and

the mesophilic ferments from *St. cremoris*, *lactis*, *diacetylactis* and *L. cremoris*.

15. Process according to claims 9-14, characterized in that in step i) the fermented milk concentrate was mixed with cream (30-40% fat) and saccharose and probiotic bacteria such as *Bifidobacterium infantis* are eventually added.

16. Use of the milky mousse of the claims from 1 to 8 for preparing a dessert.

17. Use according to claim 16, characterized in that the upper layer consists of the milky mousse of the claims 1-8 and the lower layer consists of egg-flip, chocolate cream, coffee cream, wood strawberry, wood fruit, wherein the milky mousse/lower layer ratio is of 1:1, 2:3, 3:7 or 60:40, and wherein in the case of wood strawberry and wood fruit a sugar mixture was employed consisting of cane sugar, saccharose and fructose and the fruit:soluble solids ratio is of 70:44.

18. A dessert comprising an upper layer consisting of the mousse of claims 1 to 8 and a lower layer consisting of egg-flip, chocolate, coffee cream, wood strawberry, wood fruit and the like in a ratio of 1:1, 2:3, 3:7 or 60:40.

